CLAIM(S)

1. A display device including thin film transistors formed on an insulation substrate, wherein

the thin film transistor comprises a semiconductor layer, a gate electrode and a gate insulation film which is interposed between the semiconductor layer and the gate electrode, and

the carbon concentration of the gate insulation film has the distribution in which the carbon concentration is smaller at a side close to the semiconductor layer than at a side remote from the semiconductor layer.

2. A display device according to claim 1, wherein the gate insulation film includes at least one layer of deposition film which is deposited by a deposition method, and the carbon concentration of one deposition film which is formed without interposing other deposition film deposited by a deposition method between the one deposition film and the semiconductor layer has the distribution in which the carbon concentration is smaller at a side close to the semiconductor layer than at a side remote from the semiconductor layer.

3. A display device according to claim 2, wherein with respect to the carbon concentration of the one deposition film, the carbon concentration at the side close to the semiconductor layer is equal to or less than 1/10 the carbon concentration at the side remote from the semiconductor layer.

4. A display device according to claim 3, wherein with

respect to the carbon concentration of the one deposition film, the carbon concentration at the side close to the semiconductor layer is 1E20 to 1E21 [cm^{-3}] and the carbon concentration at the side remote from the semiconductor layer is 1E21 to 1E22 [cm^{-3}].

5. A display device according to claim 4, wherein the one deposition film is a film which is deposited by a CVD method using a raw material gas containing carbons.

6. A display device according to claim 5, wherein the gate insulation film includes an oxide film which is formed by a method other than a deposition method between the one deposition film and the semiconductor layer.

7. A display device according to claim 6, wherein in the thin film transistor, the semiconductor layer is arranged between the insulation substrate on which the thin film transistor is formed and the gate electrode.

8. A display device according to claim 7, wherein the semiconductor layer includes a polycrystalline silicon layer.

9. A display device according to claim 8, wherein the thin film transistor is an n-channel type thin film transistor.

10. A display device according to claim 8, wherein the thin film transistor is an n-channel type thin film transistor having a single drain structure.

11. A display device according to claim 8, wherein the thin film transistor is a p-channel type thin film transistor.

12. A display device according to claim 11, wherein the semiconductor layer of the thin film transistor is a semiconductor layer having crystals having a size of 1μm or more when measured at least in one direction.

13. A display device according to claim 12, wherein the display device is a liquid crystal display device.

14. A display device according to claim 12, wherein the display device is an organic EL display device.

15. A manufacturing method of a display device including thin film transistors on an insulation substrate, wherein the thin film transistor includes a semiconductor layer, a gate electrode and a gate insulation film arranged between the semiconductor layer and the gate electrode, and the gate insulation film includes at least one layer of a deposition film deposited by a deposition method, wherein

at the time of forming one deposition film without interposing other deposition film deposited by a deposition method between the one deposition film and the semiconductor layer, the one deposition film is formed such that the carbon concentration of the deposition film has the distribution in which the carbon concentration is smaller at a side close to the semiconductor layer than at a side remote from the semiconductor layer.

16. A manufacturing method of a display device according to claim 15, wherein at the time of forming the one deposition

film, the one deposition film is formed by a CVD method in which a flow rate ratio of a gas containing carbons to a gas containing no carbons is changed.

17. A manufacturing method of a display device according to claim 16, wherein at the time of forming the one deposition film, the one deposition film is formed by a CVD method in which the flow rate ratio of the gas containing carbons to the gas containing no carbons is set small when the one deposition film is close to the semiconductor layer and is set large when the one deposition film is remote from the semiconductor layer.

18. A manufacturing method of a display device including thin film transistors on an insulation substrate, wherein the thin film transistor includes a semiconductor layer, a gate electrode and a gate insulation film arranged between the semiconductor layer and the gate electrode, and the gate insulation film includes at least one layer of a deposition film deposited by a deposition method, wherein

at the time of forming one deposition film without interposing other deposition film deposited by a deposition method between the one deposition film and the semiconductor layer, the one deposition film is formed by a CVD method in which a flow rate ratio of a gas containing carbons to a gas containing no carbons is set small when the one deposition film is close to the semiconductor layer and is set large when the one deposition film is remote from the semiconductor layer.

19. A manufacturing method of a display device according to claim 18, wherein at the time of forming the one deposition film, the one deposition film is formed by a CVD method by setting the flow rate ratio of the gas containing carbons to the gas containing no carbons at the time of starting the film formation smaller than at the time of finishing the film formation.

20. A manufacturing method of a display device according to claim 19, wherein at the time of forming the gate insulation film, an oxide film is formed on the semiconductor layer by a method other than the deposition method and, thereafter, one deposition film is formed by a deposition method.